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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/580,797	05/26/2006	Alain Guillard	Serie 6423	7256

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EXAMINER	
HAMO, PATRICK	

ART UNIT	PAPER NUMBER
3746	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/580,797	GUILLARD ET AL.	
	Examiner	Art Unit	
	PATRICK HAMO	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 February 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *13-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13-21* is/are rejected.

7)☒ Claim(s) *22* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This action is in response to after final request for reconsideration filed on February 5, 2010.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 13-19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barchas et al., US 5,082,481 in view of Kaellis, US 6,808,017.

In regard to claims 13-15:

Barchas discloses a gas compression system comprising 5 stages (12, 18, 24, 30, 36), each stage followed by a cooler system (14, 20, 26, 32, 48/50/52). The pressure of the gas leaving the first compressor stage 12 is between 25 and 40 psig and the outlet pressure of final compressor stage 36 is 450-650 psig. Barchas does not explicitly disclose that the pressure drop is higher through the last set of coolers than the first. However, cooler optimization tends to involve employing the highest pressure drop one can tolerate as this permits higher heat transfer coefficients; increasing tube and fin density, using a greater number of smaller diameter tubes, etc. increases heat

transfer coefficient, but at some point the pressure drop increase leads to unacceptable pumping losses due to the higher pumping power required to obtain the desired throughflow. Kaellis teaches that a common goal in the design of heat exchangers "is to enhance heat transfer while trying to keep the associated pressure drop low, or in other words to maximize the ratio of the heat transfer coefficient to the pressure drop. The higher the pressure drop, the more energy must be expended to pump the fluids through heat exchanger" (column 1, lines 29-35). Barchas discloses only nominal coolers, but both for the reason that there is a set of three coolers in the final stage cooler system as opposed to single coolers at every other stage, and because the pressure is higher at the final stage so as to accomodate a cooler with a higher heat transfer coefficient that may have an accompanying higher pressure drop, it would have been obvious to one skilled in the art that, with the teaching of Kaellis, it would have been an obvious engineering design choice to sacrifice more pressure drop at higher pressure to get a higher heat transfer coefficient out of the last cooler system.

In regard to claims 16 and17:

The final stage compressor, downstream from all other compressors, has a higher pressure drop due to the multiple coolers coming after the compression stage. In fact, with two coolers identical to each individual cooler in the prior stages, implied by the disclosure of Barchas, the pressure drop is 100% larger at this stage.

In regard to claim 18:

Barchas discloses that the unit is for separating a gas mixture (H_2) from a cracking effluent (Abstact).

In regard to claim 19:

Barchas discloses a cryogenic distillation unit comprising at least one distillation column 60 (col. 6, ll. 5-29), means for sending compressed gas to a column of the unit (via lines 59), means for withdrawing a liquid from a column of the unit (line 61), means for vaporizing the liquid by heat exchange with a compressed gas (where lines 45 and 61 meet), the compressed gas having been compressed by the final stage of the compressor.

In regard to claim 21:

Barchas discloses a method of separating a gas using cryogenic distillation whereby the gas is compressed in the compressor to a pressure of 550-650 psi at the final stage of the compressor.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 19 in view of Wong et al., US 6,685,903.

The references as applied to claim 19 teach all of the limitations substantially as claimed except for the following taught by Wong: a heat exchanger 114 for vaporizing the liquid coming from distillation column 120 using the gas coming from the second

stage compressor 122. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the distillation column of Barchas with the heat exchanger system of Wong to cool the discharge liquid from the distillation column.

Allowable Subject Matter

Claim 22 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments with respect to the rejection(s) of claim(s) 13-21 under 35 U.S.C. 102 and 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of newly cited art.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PATRICK HAMO whose telephone number is (571)272-3492. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on 571-272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Charles G Freay/
Primary Examiner, Art Unit 3746

/Patrick Hamo/
AU 3746